Comment on "Trapped-Ion Based Technique for Measuring the Nuclear Radii of Highly-Charged Radioactive Isotopes"

In a recent letter [1] we reported a measurement of the difference in the mean square radius between ^{233}U and ^{238}U as $\delta\langle r^2\rangle^{233,238} = -0.457 \pm 0.043$ fm^2. This measurement was based on the spectroscopy of few-electron U ions observed in an electron beam ion trap (EBIT). Specifically the $2s_{1/2}$-$2p_{3/2}$ transitions in Li-, Be-, B-, and C-like ^{233}U and ^{238}U were measured. The change in nuclear size was deduced from the isotopic dependence of the transitions energies.

We measured a shift in the transition energies of about 320 meV between the two isotopes. To translate this isotopic energy shift into $\delta\langle r^2\rangle^{233,238}$, we incorporated a nuclear polarization correction in the amount of 24 meV. The value of this correction was based on the theoretical work of Ref. [2]. Subsequent to our publication, the authors of Ref. [3] published an erratum [err] in which they state that they overestimated the size of the nuclear polarization correction by a factor of 2π. Using the corrected value of the nuclear polarization correction (4 meV), we determine $\delta\langle r^2\rangle^{233,238} = -0.432 \pm 0.043$ fm^2, which can be compared to a new global mean of all measurements of $\delta\langle r^2\rangle^{233,238} = -0.422 \pm 0.028$ fm^2. The other qualitative conclusions in our paper do not change.

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